

119TH CONGRESS
1ST SESSION

H. R. 730

To coordinate Federal research and development efforts focused on modernizing mathematics in STEM education through mathematical and statistical modeling, including data-driven and computational thinking, problem, project, and performance-based learning and assessment, interdisciplinary exploration, and career connections, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

JANUARY 24, 2025

Ms. HOULAHAN (for herself and Mr. BAIRD) introduced the following bill;
which was referred to the Committee on Science, Space, and Technology

A BILL

To coordinate Federal research and development efforts focused on modernizing mathematics in STEM education through mathematical and statistical modeling, including data-driven and computational thinking, problem, project, and performance-based learning and assessment, interdisciplinary exploration, and career connections, and for other purposes.

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*

3 **SECTION 1. SHORT TITLE.**

4 This Act may be cited as the “Mathematical and Sta-
5 tistical Modeling Education Act”.

1 **SEC. 2. MATHEMATICAL AND STATISTICAL MODELING EDU-**
2 **CATION.**

3 (a) FINDINGS.—Congress finds the following:

4 (1) The mathematics taught in schools, includ-
5 ing statistical problem solving and data science, is
6 not keeping pace with the rapidly evolving needs of
7 the public and private sector, resulting in a STEM
8 skills shortage and employers needing to expend re-
9 sources to train and upskill employees.

10 (2) According to the Bureau of Labor Statis-
11 tics, the United States will need 1,000,000 addi-
12 tional STEM professionals than it is on track to
13 produce in the coming decade.

14 (3) The field of data science, which is relevant
15 in almost every workplace, relies on the ability to
16 work in teams and use computational tools to do
17 mathematical and statistical problem solving.

18 (4) Many STEM occupations offer higher
19 wages, more opportunities for advancement, and a
20 higher degree of job security than non-STEM jobs.

21 (5) The STEM workforce relies on computa-
22 tional and data-driven discovery, decision making,
23 and predictions, from models that often must quan-
24 tify uncertainty, as in weather predictions, spread of
25 disease, or financial forecasting.

1 (6) Most fields, including analytics, science, eco-
2 nomics, publishing, marketing, actuarial science, op-
3 erations research, engineering, and medicine, require
4 data savvy, including the ability to select reliable
5 sources of data, identify and remove errors in data,
6 recognize and quantify uncertainty in data, visualize
7 and analyze data, and use data to develop under-
8 standing or make predictions.

9 (7) Rapidly emerging fields, such as artificial
10 intelligence, machine learning, quantum computing
11 and quantum information, all rely on mathematical
12 and statistical concepts, which are critical to prove
13 under what circumstances an algorithm or experi-
14 ment will work and when it will fail.

15 (8) Military academies have a long tradition in
16 teaching mathematical modeling and would benefit
17 from the ability to recruit students with this exper-
18 tise from their other school experiences.

19 (9) Mathematical modeling has been a strong
20 educational priority globally, especially in China,
21 where participation in United States mathematical
22 modeling challenges in high school and higher edu-
23 cation is orders of magnitude higher than in the
24 United States, and Chinese teams are taking a ma-
25 jority of the prizes.

1 (10) Girls participate in mathematical modeling
2 challenges at all levels at similar levels as boys, while
3 in traditional mathematical competitions girls par-
4 ticipate less and drop out at every stage. Students
5 cite opportunity for teamwork, using mathematics
6 and statistics in meaningful contexts, ability to use
7 computation, and emphasis on communication as
8 reasons for continued participation in modeling chal-
9 lenges.

10 (b) DEFINITIONS.—In this section:

11 (1) DIRECTOR.—The term “Director” means
12 the Director of the National Science Foundation.

13 (2) FEDERAL LABORATORY.—The term “Fed-
14 eral laboratory” has the meaning given such term in
15 section 4 of the Stevenson-Wydler Technology Inno-
16 vation Act of 1980 (15 U.S.C. 3703).

17 (3) FOUNDATION.—The term “Foundation”
18 means the National Science Foundation.

19 (4) INSTITUTION OF HIGHER EDUCATION.—The
20 term “institution of higher education” has the
21 meaning given such term in section 101(a) of the
22 Higher Education Act of 1965 (20 U.S.C. 1001(a)).

23 (5) MATHEMATICAL MODELING.—The term
24 “mathematical modeling” has the meaning given
25 such term in the 2019 Guidelines to Assessment and

1 Instruction in Mathematical Modeling Education
2 (GAIMME) report, 2nd edition.

3 (6) OPERATIONS RESEARCH.—The term “oper-
4 ations research” means the application of scientific
5 methods to the management and administration of
6 organized military, governmental, commercial, and
7 industrial processes to maximize operational effi-
8 ciency.

9 (7) STATISTICAL MODELING.—The term “sta-
10 tistical modeling” has the meaning given such term
11 in the 2021 Guidelines to Assessment and Instruc-
12 tion in Statistical Education (GAISE II) report.

13 (8) STEM.—The term “STEM” means the
14 academic and professional disciplines of science,
15 technology, engineering, and mathematics, including
16 computer science.

17 (c) PREPARING EDUCATORS TO ENGAGE STUDENTS
18 IN MATHEMATICAL AND STATISTICAL MODELING.—The
19 Director shall make awards on a merit-reviewed, competi-
20 tive basis to institutions of higher education and nonprofit
21 organizations (or a consortium thereof) for research and
22 development to advance innovative approaches to support
23 and sustain high-quality mathematical modeling education
24 in schools that are operated by local educational agencies,
25 including statistical modeling, data science, operations re-

1 search, and computational thinking. The Director shall en-
2 courage applicants to form partnerships to address critical
3 transitions, such as middle school to high school, high
4 school to college, and school to internships and jobs.

5 (d) APPLICATION.—An entity seeking an award
6 under subsection (c) shall submit an application at such
7 time, in such manner, and containing such information as
8 the Director may require. The application shall include the
9 following:

10 (1) A description of the target population to be
11 served by the research activity for which such an
12 award is sought, including student subgroups de-
13 scribed in section 1111(b)(2)(B)(xi) of the Elemen-
14 tary and Secondary Education Act of 1965 (20
15 U.S.C. 6311(b)(2)(B)(xi)), and students experi-
16 encing homelessness and children and youth in fos-
17 ter care.

18 (2) A description of the process for recruitment
19 and selection of students, educators, or local edu-
20 cational agencies to participate in such research ac-
21 tivity.

22 (3) A description of how such research activity
23 may inform efforts to promote the engagement and
24 achievement of students, including students from
25 groups historically underrepresented in STEM, in

1 prekindergarten through grade 12 in mathematical
2 modeling and statistical modeling using problem-
3 based learning with contextualized data and com-
4 putational tools.

5 (4) In the case of a proposal consisting of a
6 partnership or partnerships with one or more local
7 educational agencies and one or more researchers, a
8 plan for establishing a sustained partnership that is
9 jointly developed and managed, draws from the ca-
10 pacities of each partner, and is mutually beneficial.

11 (e) PARTNERSHIPS.—In making awards under sub-
12 section (c), the Director shall encourage applications that
13 include the following:

14 (1) Partnership with a nonprofit organization
15 or an institution of higher education that has exten-
16 sive experience and expertise in increasing the par-
17 ticipation of students in prekindergarten through
18 grade 12 in mathematical modeling and statistical
19 modeling.

20 (2) Partnership with a local educational agency,
21 a consortium of local educational agencies, or Tribal
22 educational agencies.

23 (3) An assurance from school leaders to making
24 reforms and activities proposed by the applicant a
25 priority.

1 (4) Ways to address critical transitions, such as
2 middle school to high school, high school to college,
3 and school to internships and jobs.

4 (5) Input from education researchers and cog-
5 nitive scientists, as well as practitioners in research
6 and industry, so that what is being taught is up-to-
7 date in terms of content and pedagogy.

8 (6) A communications strategy for early con-
9 versations with parents, school leaders, school
10 boards, community members, employers, and other
11 stakeholders.

12 (7) Resources for parents, school leaders, school
13 boards, community members, and other stakeholders
14 to build skills in modeling and analytics.

15 (f) USE OF FUNDS.—An entity that receives an
16 award under this section shall use the award for research
17 and development activities to advance innovative ap-
18 proaches to support and sustain high-quality mathe-
19 matical modeling education in public schools, including
20 statistical modeling, data science, operations research, and
21 computational thinking, which may include the following:

22 (1) Engaging prekindergarten through grade 12
23 educators in professional learning opportunities to
24 enhance mathematical modeling and statistical prob-
25 lem solving knowledge, and developing training and

1 best practices to provide more interdisciplinary
2 learning opportunities.

3 (2) Conducting research on curricula and teach-
4 ing practices that empower students to choose the
5 mathematical, statistical, computational, and techno-
6 logical tools they will apply to a problem, as is re-
7 quired in life and the workplace, rather than pre-
8 scribing a particular approach or method.

9 (3) Providing students with opportunities to ex-
10 plore and analyze real data sets from contexts that
11 are meaningful to the students, which may include
12 the following:

13 (A) Missing or incorrect values.

14 (B) Quantities of data that require choice
15 and use of appropriate technology.

16 (C) Multiple data sets that require choices
17 about which data are relevant to the current
18 problem.

19 (D) Data of various types including quan-
20 tities, words, and images.

21 (4) Taking a school or district-wide approach to
22 professional development in mathematical modeling
23 and statistical modeling.

24 (5) Engaging rural local agencies.

1 (6) Supporting research on effective mathe-
2 matical modeling and statistical modeling teaching
3 practices, including problem- and project-based
4 learning, universal design for accessibility, and ru-
5 brics and mastery-based grading practices to assess
6 student performance.

7 (7) Designing and developing pre-service and
8 in-service training resources to assist educators in
9 adopting transdisciplinary teaching practices within
10 mathematics and statistics courses.

11 (8) Coordinating with local partners to adapt
12 mathematics and statistics teaching practices to le-
13 verage local natural, business, industry, and commu-
14 nity assets in order to support community-based
15 learning.

16 (9) Providing hands-on training and research
17 opportunities for mathematics and statistics edu-
18 cators at Federal laboratories, institutions of higher
19 education, or in industry.

20 (10) Developing mechanisms for partnerships
21 between educators and employers to help educators
22 and students make connections between their mathe-
23 matics and statistics projects and topics of relevance
24 in today's world.

1 (11) Designing and implementing professional
2 development courses and experiences, including men-
3 toring for educators, that combine face-to-face and
4 online experiences.

5 (12) Reducing gaps in access to learning oppor-
6 tunities for students from groups historically under-
7 represented in STEM.

8 (13) Providing support and resources for stu-
9 dents from groups historically underrepresented in
10 STEM.

11 (14) Addressing critical transitions, such as
12 middle school to high school, high school to college,
13 and school to internships and jobs.

14 (15) Researching effective approaches for en-
15 gaging students from groups historically underrep-
16 resented in STEM.

17 (16) Any other activity the Director determines
18 will accomplish the goals of this section.

19 (g) EVALUATIONS.—All proposals for awards under
20 this section shall include an evaluation plan that includes
21 the use of outcome oriented measures to assess the impact
22 and efficacy of the award. Each recipient of an award
23 under this section shall include results from such evalua-
24 tive activities in annual and final project reports.

25 (h) ACCOUNTABILITY AND DISSEMINATION.—

1 (1) EVALUATION REQUIRED.—The Director
2 shall evaluate the portfolio of awards made under
3 this section. Such evaluation shall—

4 (A) use a common set of benchmarks and
5 tools to assess the results of research conducted
6 under such awards and identify best practices;
7 and

8 (B) to the extent practicable, integrate the
9 findings of research resulting from the activities
10 funded through such awards with the findings
11 of other research on student’s pursuit of de-
12 grees or careers in STEM.

13 (2) REPORT ON EVALUATIONS.—Not later than
14 180 days after the completion of the evaluation
15 under paragraph (1), the Director shall submit to
16 Congress and make widely available to the public a
17 report that includes the following:

18 (A) The results of the evaluation.

19 (B) Any recommendations for administra-
20 tive and legislative action that could optimize
21 the effectiveness of the awards made under this
22 section.

23 (i) FUNDING.—From amounts appropriated or other-
24 wise made available for the Directorate for STEM Edu-
25 cation of the National Science Foundation, the Director

1 shall allocate \$10,000,000 for each of the fiscal years
2 2026 through 2030 to carry out this section.

3 **SEC. 3. NASEM REPORT ON MATHEMATICAL AND STATIS-**
4 **TICAL MODELING EDUCATION IN PRE-**
5 **KINDERGARTEN THROUGH 12TH GRADE.**

6 (a) STUDY.—Not later than 180 days after the date
7 of the enactment of this Act, the Director shall seek to
8 enter into an agreement with the National Academies of
9 Sciences, Engineering and Medicine (in this section re-
10 ferred to as “NASEM”) (or if NASEM declines to enter
11 into such an agreement, another appropriate entity) under
12 which NASEM, or such other appropriate entity, agrees
13 to conduct a study on the following:

14 (1) Factors that enhance or barriers to the im-
15 plementation of mathematical modeling and statis-
16 tical modeling in elementary and secondary edu-
17 cation, including opportunities for and barriers to
18 use modeling to integrate mathematical and statis-
19 tical ideas across the curriculum, including the fol-
20 lowing:

21 (A) Pathways in mathematical modeling
22 and statistical problem solving from kinder-
23 garten to the workplace so students are able to
24 identify opportunities to use their school mathe-
25 matics and statistics in a variety of jobs and

1 life situations and so employers can benefit
2 from students' school learning of data science,
3 computational thinking, mathematics, statistics,
4 and related subjects.

5 (B) The role of community-based prob-
6 lems, service-based learning, and internships for
7 connecting students with career preparatory ex-
8 periences.

9 (C) Best practices in problem-, project-,
10 performance-based learning and assessment.

11 (2) Characteristics of teacher education pro-
12 grams that successfully prepare teachers to engage
13 students in mathematical modeling and statistical
14 modeling, as well as gaps and suggestions for build-
15 ing capacity in the pre-service and in-service teacher
16 workforce.

17 (3) Mechanisms for communication with stake-
18 holders, including parents, administrators, and the
19 public, to promote understanding and knowledge of
20 the value of mathematical modeling and statistical
21 modeling in education.

22 (b) PUBLIC STAKEHOLDER MEETING.—In the course
23 of completing the study described in subsection (a),
24 NASEM or such other appropriate entity shall hold not

1 fewer than one public meeting to obtain stakeholder input
2 on the topics of such study.

3 (c) REPORT.—The agreement under subsection (a)
4 shall require NASEM, or such other appropriate entity,
5 not later than 24 months after the effective date of such
6 agreement, to submit to the Director, the Secretary of
7 Education, and the Congress a report containing the fol-
8 lowing:

9 (1) The results of the study conducted under
10 subsection (a).

11 (2) Recommendations to modernize the proc-
12 esses described in subsection (a)(1).

13 (3) Recommendations for such legislative and
14 administrative action as NASEM, or such other ap-
15 propriate entity, determines appropriate.

16 (d) FUNDING.—From amounts appropriated or oth-
17 erwise made available for the Directorate for STEM Edu-
18 cation of the National Science Foundation, the Director
19 shall allocate up to \$1,000,000 for fiscal year 2026 to
20 carry out this section.

21 **SEC. 4. LIMITATIONS.**

22 (a) LIMITATION ON FUNDING.—Amounts made avail-
23 able to carry out sections 2 and 3 shall be derived from
24 amounts appropriated or otherwise made available to the
25 National Science Foundation.

1 (b) SUNSET.—The authority to provide awards under
2 this Act shall expire on September 30, 2029.

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